Project Introduction

In response to NASA SBIR topic X1.04, Ridgetop Group will extend and adapt RingDown: an innovative system for the non-invasive prognostic monitoring of the health of electromechanical actuators and related power systems. This comprehensive solution provides both advanced hardware sensors to monitor the systems and prognostic health management algorithms to interpret the signals available in them. RingDown will significantly improve the reliability of and confidence in these critical NASA systems by alerting NASA personnel to impending failures well before they occur, averting disaster and improving confidence in the health of the systems. Electromechanical actuators (EMAs) are comprised of a complex system-of-systems: a high-power switch mode power supply to power the EMA's servo drive, a lower-voltage switch mode power supply to power the EMA's logic controller, power inverters, and the EMA itself. The sensors and algorithms provided by Ridgetop will allow NASA to monitor the health of and anticipate failures in all of these systems. In addition, these algorithms will be applicable to other switch mode power supplies (SMPSs), which are a very common component in NASA's electrical systems. Ridgetop's goal in this SBIR program is to transition these EMA prognostic health management technologies into fielded systems. In Phase I, Ridgetop will extend the RingDown sensors developed under previous NASA SBIRs to monitor additional components in the EMA system-of-systems. Ridgetop will also prototype the algorithms to interpret the data from those sensors in this Phase. In Phase II, Ridgetop will implement additional functionality for these algorithms and then field-test the combined algorithm and sensor solution. In a future Phase III or other commercialization program, a final version of this comprehensive solution will be demonstrated in-flight and then transitioned into actual system usage.

EXPLORE

SPACE TECHNOLOGY MISSION DIRECTORATE

SBIR/STTR

Prognostic Fault Detection and Isolation for EMA and EPS Systems, Phase I

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https://techport.nasa.gov/view/9835

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Prognostic Fault Detection and Isolation for EMA and EPS Systems, Phase I

Completed Technology Project (2010 - 2010)

Primary U.S. Work Locations and Key Partners
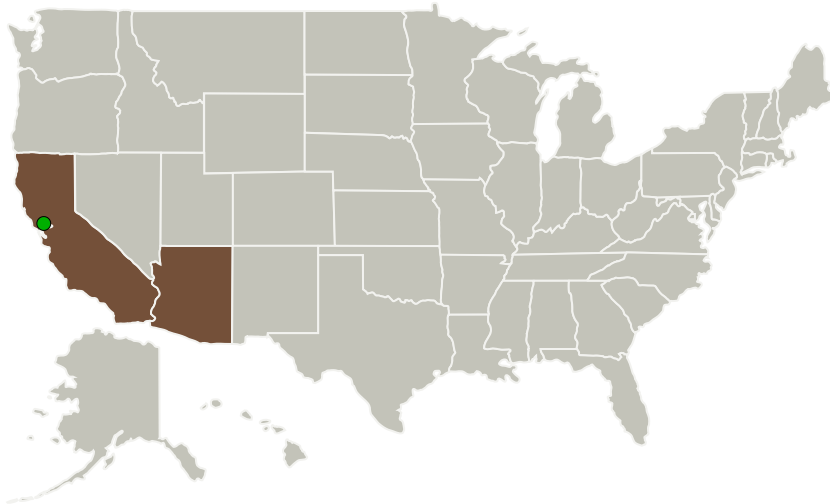
Organizations Performing Work	Role	Type	Location
Ridgetop Group, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
Arizona	California

Project Transitions

▶ **January 2010:** Project Start

✔ **July 2010:** Closed out

  Closeout Documentation:
  - Final Summary Chart(*https://techport.nasa.gov/file/139353*)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Ridgetop Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:
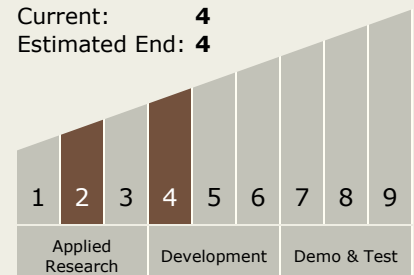
Carlos Torrez

Principal Investigator:

Justin Judkins

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**

1	2	3	4	5	6	7	8	9

Applied Research | Development | Demo & Test

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  └ TX17.2 Navigation Technologies
    └ TX17.2.3 Navigation Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System